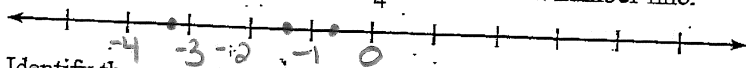


Chapter 1

Real Numbers and Expressions

1. Graph the real numbers $-\sqrt{2}$, $-\frac{3}{4}$, and $-\pi$ on a number line.



2. Identify the property or definition that the statement illustrates.

a. $0 + 8 = 8$ Identity +

b. $(2 + 6) + 3 = 2 + (6 + 3)$ Assoc +

c. $9 \div 3 = 9 \cdot \frac{1}{3}$ Inverse \times

d. $5(4 + 3) = 5(4) + 5(3)$ Distr

e. $8 - 6 = 8 + (-6)$ Inverse +

3. An elevator descends at the rate of 22 feet per second. What is this rate in miles per hour?

$$\frac{22 \text{ feet}}{1 \text{ sec}} \cdot \frac{1 \text{ mile}}{5280 \text{ ft}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = \frac{79200 \text{ mi}}{5280 \text{ hr}} = 15 \text{ mph}$$

4. What is the value of $-2p - p^2$ when $p = 3$?

A. -15

B. -12

C. -3

D. 3

$$\begin{aligned} -2(3) - 3^2 \\ -6 - 9 \end{aligned}$$

5. What is the value of $w - (w + 2)^2$ when $w = -5$?

$$\begin{aligned} -5 - (-5 + 2)^2 \\ -5 - 9 = \boxed{-14} \end{aligned}$$

6. Which of the following shows the expression $5(q - 3) + 2(4 - q)$ in simplified form?

A. $3q + 5$

B. $3q - 7$

C. $4q + 5$

D. $4q - 7$

$$5q - 15 + 8 - 2q$$

7. The length of a rectangle measures $m + 4$ inches. The width of the rectangle measures $3m - 2$ inches.

- a. Write and simplify an expression for the perimeter of the rectangle.

$$\begin{aligned} 2(m + 4) + 2(3m - 2) \\ 2m + 8 + 6m - 4 \\ \boxed{8m + 4} \end{aligned}$$

- b. How many inches is the perimeter of the rectangle when $m = 6$?

$$8(6) + 4 = \boxed{52 \text{ inches}}$$

Problem Solving

8. An art teacher buys 20 paint sets for her art class. Each small set costs \$4.50. Each large set costs \$6.00.
- a. Write and simplify an expression for the total cost of the paint sets if the art teacher buys p small paint sets.

$$4.50p + 6(20 - p)$$

$$4.5p + 120 - 6p$$

$$120 - 1.5p$$

- b. Find the total cost of the paint sets if 12 of the 20 paint sets are small.

$$120 - 1.5(12)$$

$$120 - 18$$

$$\boxed{\$102}$$

9. A gym charges a one-time membership fee of \$75 in addition to a monthly fee. You join the gym and pay \$435 for a 12-month period.
- a. Write an equation to find m , the monthly membership fee.

$$\boxed{12m + 75 = 435}$$

- b. Solve the equation to find the monthly fee.

$$12m + 75 = 435$$

$$12m = 360$$

$$\boxed{m = 30}$$

10. The table below shows the distance traveled by a San Francisco cable car after making the first stop along its route. Find the total distance the cable car traveled 8 seconds after leaving the first stop.

Time (s), t	0	1	2	3	4
Distance (ft), d	510	524	538	552	566

$$d = 14(8) + 510$$

$$\boxed{d = 622}$$

$$\boxed{d = 14t + 510}$$

11. A landscaper has a piece of tubing that is 45 feet long. He cuts it into five pieces. Three of the pieces are the same length. The other two pieces are 3 feet and 5 feet longer than the equal-length pieces.

- a. Draw a diagram of this situation.



- b. Write and solve an equation to find the lengths of the 5 pieces.

$$45 = x + x + x + x + 3 + x + 5$$

$$45 = 5x + 8$$

$$37 = 5x$$

$$x = 7.4$$

$$\begin{array}{ll} 7.4 \text{ ft} & 10.4 \text{ ft} \\ 7.4 \text{ ft} & 12.4 \text{ ft} \\ 7.4 \text{ ft} & \end{array}$$

Linear Equations

12. What is the solution of $8 + 5z = 2(3z - 7)$?

A. -6

B. 2

C. 15

D. 22

$$8 + 5z = 6z - 14$$

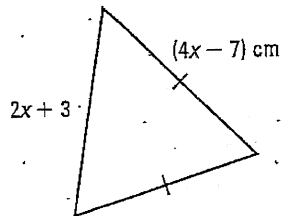
$$22 = z$$

13. Solve the equation $3(5 - 8x) = 15 - 4(6x - 1)$.

$$15 - 24x = 15 - 24x + 4$$

$$0 = 4 \quad \emptyset$$

14. The triangle below has a perimeter of 64 centimeters.



a. Write an equation representing the perimeter of the triangle in terms of x .

$$2x + 3 + 4x - 7 + 4x - 7 = 64$$

$$10x - 11 = 64$$

b. Solve the equation for the value of x .

$$10x - 11 = 64$$

$$10x = 75$$

$$x = 7.5$$

c. What is the length, in centimeters, of the longest side of this triangle?

$$2(7.5) + 3$$

$$18 \text{ cm}$$

$$4(7.5) - 7$$

$$23 \text{ cm}$$

15. Solve the formula $A = \frac{1}{2}(b_1 + b_2)h$ for h .

A. $h = A - \frac{1}{2}(b_1 + b_2)$

B. $h = \frac{A}{2(b_1 + b_2)}$

C. $h = \frac{2A}{b_1 + b_2}$

D. $h = 2A(b_1 + b_2)$

$$\frac{2A}{b_1 + b_2} = h$$

16. Solve the formula $F = \frac{9}{5}C + 32$ for C . Then find the temperature in degrees Celsius when it is 77° Fahrenheit outside.

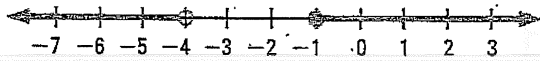
$$\frac{5}{9}(F - 32) = C$$

$$\frac{5}{9}(77 - 32) = C$$

$$C = 25^\circ$$

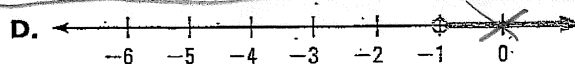
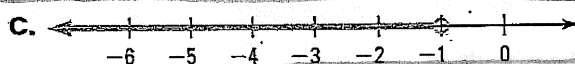
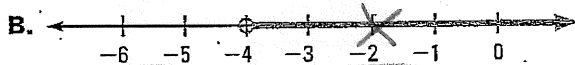
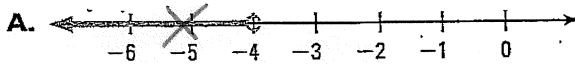
Inequalities

31. What solution is represented on the line graph below?



$$x < -4 \text{ or } x \geq -1$$

32. Which line graph shows the solution to the inequality $3 - 2g > 5$?



$$\begin{aligned} -2g &> 2 \\ g &< -1 \end{aligned}$$

33. What is the solution to the inequality $6 + 2h > h - 2$?

A. $h > -8$

B. $h > -4$

C. $h > 4$

D. $h > 8$

$$\begin{aligned} 6 + h &> -2 \\ h &> -8 \end{aligned}$$

34. You need to score at least an 85 on your next test in order to get an A in the class. Each of the 20 questions on the test is worth the same number of points. Write and solve an inequality to find the number of questions, q , that you should answer correctly to get an A in the class.

$$\frac{q}{20} \geq .85$$

$$q \geq 17$$

For Exercises 35 and 36, solve the inequality. Then graph the solution.

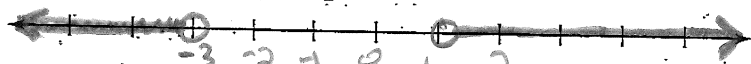
35. $2 \leq 5x - 8 < 27$



$$10 \leq 5x < 35$$

$$2 \leq x < 7$$

36. $4x + 3 < -9$ or $6x - 7 > -1$



$$4x < -12 \quad \text{or} \quad 6x > 6$$

$$x < -3$$

$$x > 1$$

For Exercises 40 and 41, solve the absolute value equation.

40. $\left| \frac{1}{2}x - 7 \right| = 5$

41. $|x - 12| = 5x$

$$\frac{1}{2}x - 7 = 5 \quad \text{or} \quad \frac{1}{2}x - 7 = -5$$

$$\frac{1}{2}x = 12 \quad \text{or} \quad \frac{1}{2}x = 2$$

$$x = 24 \quad \text{or} \quad x = 4$$

$$x - 12 = 5x \quad \text{or} \quad x - 12 = -5x$$

$$-12 = 4x \quad \text{or} \quad 6x = 12$$

$$\boxed{x = -3 \quad \text{or} \quad x = 2}$$

42. The recommended daily dosage of a vitamin is between 25 and 35 mg, inclusive. Write an absolute value inequality for this dosage range.

$$|x - 30| \leq 5$$